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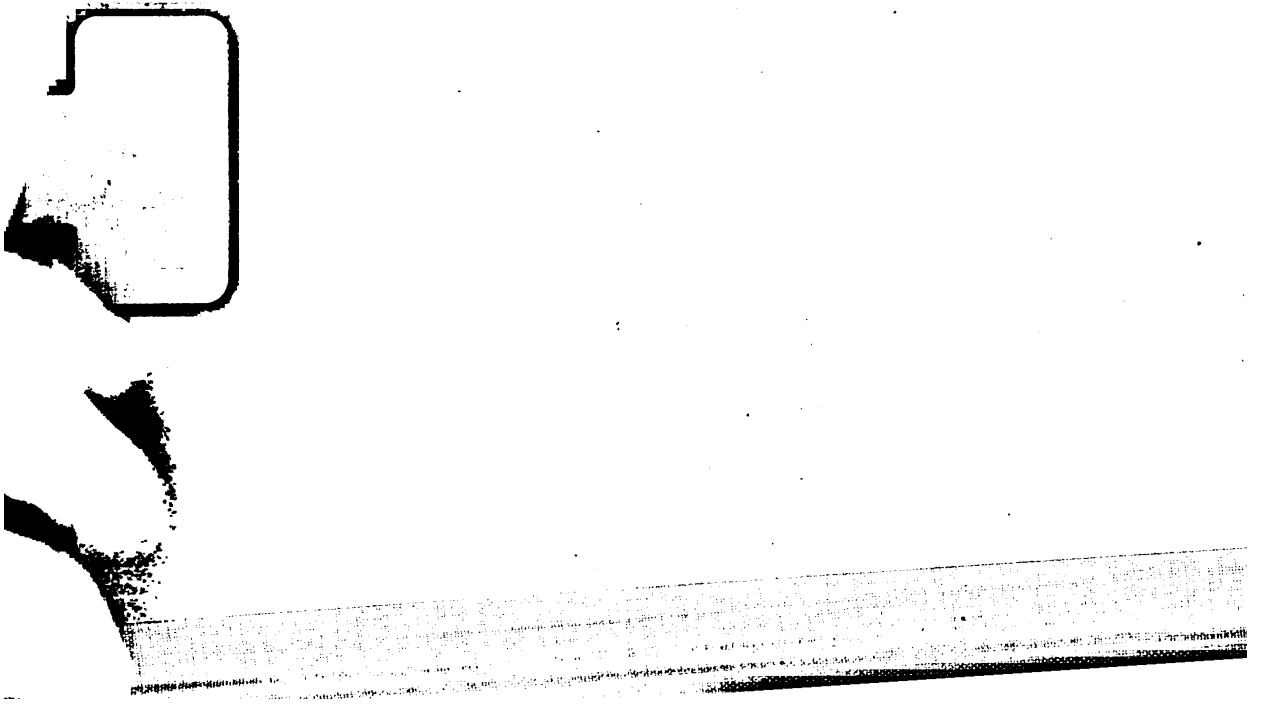

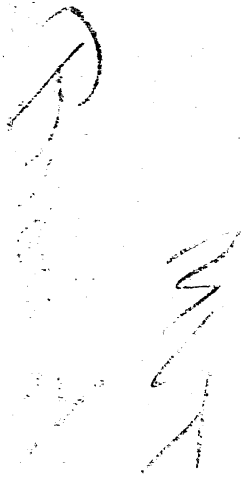

SWIMMING

Brewster
MVT

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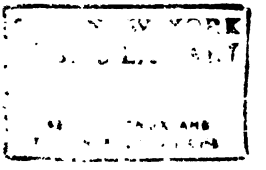
ANNETTE KELLERMAN



SWIMMING

BY

EDWIN TENNEY BREWSTER

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The Riverside Press Cambridge
1910

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PREFACE

THE present fashion of doing one's pleasure-swimming with a racing-stroke has so far transformed the practice of the ancient art that the older books on the subject have become obsolete. On the other hand, the few books now on the market that are recent enough to treat adequately the new speed-strokes, have been written by men who are interested in racing, rather than in swimming for amusement. They treat of methods of training, of sprinting starts, of saving quarter-seconds on a turn. They are addressed to ambitious and muscular youth which has no fear of the water.

This little book is of a different sort. It makes its appeal to the middle-aged

and the timid, to non-athletic persons and women, to swimmers who learned their swimming in the days of the breast-stroke and want to try the newer methods; and especially to persons who, whether swimmers or not, have children to teach, and prefer to see them started in the way they should go. It aims to set forth the whole art of swimming, both new and old; but to do this always from the standpoint of the new. It has nothing to say of racing, and little of diving. There is nothing novel in its substance: that is the common knowledge of swimmers. It is, nevertheless, uncommon in three particulars, in that it (1) develops the subject as a series of detailed and orderly lessons, with special warnings against the mistakes commonly made at each point; (2) treats the breathing and the "slide" as integral parts of the

stroke to be learned with the rest; and (3) recognizes that different persons will swim in different ways and must be taught differently, while the teaching of swimming to little children offers a special problem, often of peculiar difficulty.

I have, in short, attempted to do for the ancient art of swimming what various other authors have been doing lately for various other useful arts, from English composition to the ornamentation of sheet brass and the game of golf.

E. T. Brewster.

Andover, Massachusetts.

CONTENTS

I.	Introduction	1
II.	The Side-Stroke	7
III.	The Back-Stroke	25
IV.	The Breast-Stroke	37
V.	The Trudgeon	47
VI.	The Crawl	53
VII.	Other Strokes	61
VIII.	Diving	65
IX.	Floating	71
X.	Teaching Children to Swim	77
Index		93

to be a real swimmer, it behooves him to begin right.

With just which stroke it is best to begin, is by no means clear. Tradition is for the old breast-stroke. In certain ways, however, this is the worst of all possible strokes for the beginner, as it is the slowest of all for the expert. It does, to be sure, appeal strongly to the sex that likes to keep its hair dry; but even if one means to make it his chief reliance in the end, it can probably be mastered most easily by taking the back-stroke first. For nine persons out of ten, however, the place to attack the art is by way of the under-arm side-stroke.

The advantages of this course are pretty clear. The movements of the breast-stroke are highly artificial. This is especially true of the kick, which many persons cannot master even after years

of trying. But the movements of the side-stroke are almost instinctive — the arms paw the water alternately, the legs swing forward and back as in walking. Moreover, in the breast-stroke, the head has to be carried wholly out of the water. In the side-stroke, the head practically floats itself. Every swimmer ought to know both strokes, but experience shows that for some reason or other the breast-stroke is easy to acquire after one has been swimming the side-stroke, but that the side-stroke is difficult after one has thoroughly learned the breast-stroke. Moreover, the under-arm side-stroke leads directly to the over-arm side-stroke, and that in turn to the so-called "trudgeon." The breast-stroke does not lead anywhere.

On the other hand, the timing of the side-stroke is somewhat hard to get; and

in addition, in the case of children, the "scissor-kick" which goes with it is so nearly like running that the little learner sometimes cannot be persuaded that it is not exactly the same. However, the teaching of little children is a separate problem, which I shall consider later. For the present, the best order in which to take up the various swimming-strokes is for most persons probably this: under-arm side, over-arm side, back, breast, trudgeon. The crawl, fastest of all racing-strokes, is in a class by itself, and may be taken up anywhere. In fact, there is a good deal to be said in favor of beginning with it; and some of this I shall say later, in connection with the teaching of little children. For the present, however, let us assume that the learner has reached years of discretion, and purposes to master more than one stroke, and to do it in

the easiest way. He may, then, take his lessons in the order suggested here, or in any other which commends itself to his mind.

II

THE SIDE-STROKE

THERE is much sound sense in the ancient admonition not to go into the water until you know how to swim. Certain of the finer points of swimming are, naturally, best acquired afloat; but the foundation of the art, the fundamental principles of the stroke, are far better learned in the air. The water is confusing: it gets in one's nose; often it is so cold that unless one can swim hard to keep warm, the bath is too short for much progress. By all means let us begin our swimming in the house.

One can practice on the floor, or on a bed wide enough to be used crosswise. For the side-stroke: Lie straight as a

ramrod, on either side, the under arm stretched out at full reach above the head, the head lying on its thick part. The upper arm extends along the flank just as it hangs in the standing position. The legs are straight, and in line with the trunk. The feet are turned down in line with the shins. This is the position for the "slide," when after the kick the body runs for a yard or two by its own momentum.

For the leg-stroke: Bend the under leg at the knee until it takes the kneeling position, with the shin at right angles with the thigh; at the same time flex the ankle so that the toe approaches the shin. Now extend the foot to its toe-down position, and snap the lower leg back into its place, the instep coming against the other heel. Repeat until familiar.

Swing the upper leg forward from

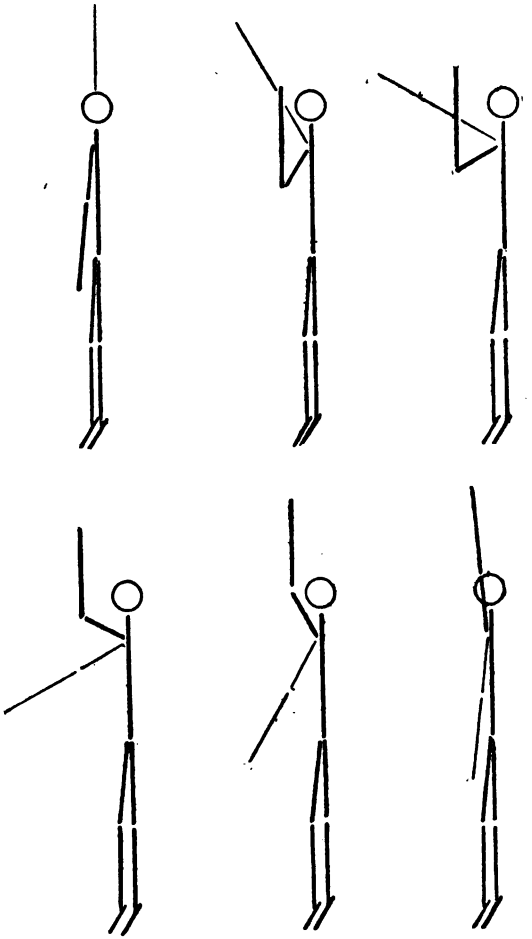

PLATE I

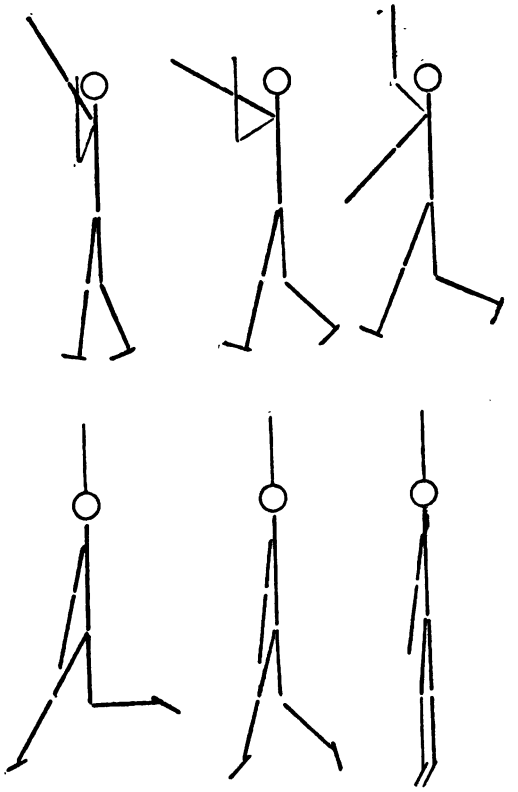

PLATE II

the hip, keeping the knee straight, but flexing the ankle as before. Carry to a foot or so from its first position; straighten the ankle, and snap back the leg until it touches the other. Repeat until familiar.

These two motions combined make the famous "scissor-kick," the invention which, more than anything else, has made the modern era in swimming. As the under leg goes back, the upper leg goes forward. They snap together, heel against instep, toes turned down; and remain motionless until it is time for them to open again. The opening should be slow; the closing with a quick snap. The common faults are, opening the legs too rapidly, and bending the upper knee.

When it comes actually to swimming the stroke, it is not essential that the knee

of the upper leg should be kept absolutely straight. The tendency, however, is always to bend it too much, while there is no real advantage in bending it at all. In practice, therefore, the best plan is to keep it straight; all too easily, the bending will take care of itself.

The advantage of the straight leg is this: in the breast-stroke, as everybody knows, the onward motion of the body stops as the legs are drawn up; for the thighs, sticking out at right angles with the body, act as a brake. In fact, not a few unskillful swimmers actually move backwards during this portion of the stroke. It was indeed to avoid just this braking effect, that the scissor-kick was invented. But if, in the scissor-kick, one bends the upper leg to a right angle with the body, he is practically, so far as the braking effect is concerned, swimming the breast-

stroke with that leg. The moral is, Don't. A too rapid opening of the legs also checks the momentum.

This is the modern form of the scissor-kick. Originally it was made much wider; the under leg was kicked out freely behind, and the upper leg drawn up until the knee almost touched the chest. This undoubtedly gives a powerful stroke; but it drags fearfully on the recovery. The modern theory is, at all costs, to cut down the resistance. Still, a slender and long-limbed swimmer can often with advantage make the scissor-kick somewhat wider than is best for the average man.

Since the scissor-kick is fundamental to an important group of strokes, one cannot practice it too thoroughly, nor understand it too well. The fact that it is so much like walking makes one forget the little but quite essential differences.

The arm-motion of the side-stroke is simple. The upper arm, extended at the side as the swimmer slides, is bent sharply at the elbow, carried to full reach beyond the head, and then, with stiff elbow and slightly hollowed palm, swept back again until it touches the thigh. The motion has two slightly different forms. In one the elbow is kept straight and the arm carried down parallel with the surface of the water. In the other, the elbow is somewhat bent, and the forearm comes down in front of the face and the trunk, with the hand lower in the water than the elbow. The first method is thought to be slightly the better; it certainly is prettier. But there is no single best way of swimming any part of any stroke. There are certain general principles; the details vary with the swimmer's build.

The under arm alternates with the

upper, recovering as it comes down, pulling as it recovers. This fortunately is instinctive, and does not have to be learned. For the under arm also there are two forms of the stroke. The arm may come down in front of the body and parallel with the surface of the water, exactly like the upper arm; or it may be carried out at the side and at right angles with the surface. The former method is reputed to be slightly faster; the latter is somewhat the better gymnastics, and is probably at least as good for swimming distance. The recovery is exactly like that of the upper arm.

The separate details of the side-stroke are, then, simple enough, and considerably easier than the corresponding movements of the breast-stroke. The only difficulty is in getting them to work together. Here, therefore, comes in

the special advantage of practice in the air.

To time the side-stroke, lie in the slide position. Carry the upper arm forward; sweep it back in its usual stroke. As it comes down, and just before it reaches the level of the face, take in the breath *through the mouth*. Rest until it is time for another breath, exhale quietly through the nose and repeat.

This matter of breathing is most important. One cannot swim, or do anything else, unless one breathes comfortably. There should, therefore, be no haphazard breathing. Every stroke should have its time for breath arranged for, like any other motion. Persons who try for years to learn to swim, and make no progress, usually suffer from a nervous spasm or an old habit which makes them hold the breath during their struggles.

The reason for inhaling through the mouth instead of the nose is obvious. One can never be quite sure, especially in rough water, which fluid he is going to suck in with his next breath. A mouthful of water can be spewed out again, or even swallowed on a pinch; for most of us are quite accustomed to having water in our mouths. But a noseful of water is another matter. The victim gasps and chokes. Not always does he escape with his life; for many cases of drowning attributed to cramp are probably in reality cases of strangling by water taken in through the nose. By all means, therefore, the beginner should start right.

The breath, then, is taken in as the upper arm comes down. At the same time the legs open slowly for their stroke. They snap together when the upper hand reaches the thigh. The arms rest during

the closing of the legs, and remain motionless, the upper arm at the side, the lower stretched out at full reach, until the momentum of the kick begins to die away. Then the under arm comes down and the upper arm recovers. In these preliminary exercises, however, the movements of the under arm must be omitted.

For this and other reasons, the time of the stroke is most conveniently taken from the upper arm. As this makes its pull, the breath comes in and the legs open. As it finishes at the thigh, the legs fall in. There is a moment's rest while the body slides, after which the upper arm goes forward again. The timing of the under arm and time for exhaling the breath will take care of themselves involuntarily.

Thus far nothing has been said concerning the side on which one shall swim. For this one must consult his own feel-

ing as to which of the two seems the more natural. In case of doubt, one is usually advised to keep the left side up, for the sake of the slightly lessened pressure on the heart; though it is pretty difficult to see how this can really make the slightest difference. The best side is, however, both sides. If one starts from the beginning practicing equally on each side, it is about as easy to learn on both sides as on one. There is a considerable advantage in this. The side-stroke is unsymmetrical, and is therefore vastly better gymnastics when swum equally on each side. Moreover, it is always pleasant, and often convenient, to be able to face either way. The change, too, is restful. This is an additional reason for making the two arm-movements unlike, and bringing down the lower at right angles with the surface.

Here is the place where the beginner makes most haste by going slowly. He will do well to practice these preliminary exercises for some weeks in the spring before he goes into the water, and to repeat them from time to time during the early stages of his progress, to make sure that he is not getting into bad habits. A child may with profit practice them in a bath-tub.

When one finally gets into the water, a convenient procedure is this: Select a beach or other flat surface which slopes somewhat steeply; lie with the head toward shore, half in the water, half out, and practice the scissor-kick alone, until it is thoroughly learned. Gradually work offshore a foot or two, supporting one's self on the hands, and drive the body ashore again with one vigorous stroke of the legs. After this, try several kicks in

succession, in water waist-deep, using only the lower hand for support.

Lie in shallow water and practice the stroke of the upper arm and the breathing. Add the kick, properly timed. Work off into deeper and deeper water; support the body by the under-arm hand on bottom, and continue the practice of upper arm, breathing, and legs. Gradually lessen the aid of the under arm until a light touch of the finger-tips is sufficient. With increased confidence and balance, get the under arm on the full reach, and slide after the kick. Finally, at the end of the slide, draw down the under arm without touching the bottom, recover immediately, as the upper arm comes down, and the lesson is learned.

The head should be carried as low as possible in the water, and turned somewhat toward the upper shoulder. Espe-

cially at first, it should be so far submerged that the water comes over both ears and nearly to the eyes. In this position the body will almost float itself. Hence comes one of the great advantages of commencing with the side-stroke. Do not, in general, use water-wings or any other artificial support. They help one to float; but they alter the balance, and in the end hinder more than they help. In default of a beach, one can use a light raft, which will tilt on one side under his weight. At the worst, one can follow these directions while he clings to some support, first with both hands, then with the under hand only.

After one has got the under-arm side-stroke pretty well learned, it becomes a simple matter to change to the single over-arm. The two are exactly alike, except that in the over-arm stroke the upper arm is carried forward above the

surface of the water. This diminishes by so much the resistance of the water, and thus increases the speed. It does, however, slightly alter the balance of the body, so that it seems a little strange at first. The upper arm, too, since it travels faster out of water than in, may start an instant later on its recovery. Morever, the weight of the arm tends to sink the head. But as the breath should be coming out as the upper arm goes forward on its recovery, it should not make any particular difference whether the nose is under water or not. It is a fundamental principle in the timing of all swimming-strokes, that, when the breath is being taken in, nothing except the head shall be out of water.

There are two common variants of the side-stroke, both of which it is important to avoid; for the reason that both will have to be unlearned before one can

advance from the single over-arm stroke to the double over-arm, or trudgeon. One of these is the habit of taking in the breath as the under arm comes down. The other is the habit of opening the legs as the upper arm goes forward and closing them as it comes-down. Both these involve a timing impossible for the double over-arm stroke. The second of them, in addition, causes the legs to act at the same time as the upper arm, so that the body, instead of progressing steadily, one member acting at a time, jumps forward in a succession of jerks as in the breast-stroke. When the side-stroke fails to give an even progress, something is wrong with it. Either the timing is wrong, or else the legs are being opened too quickly, or too wide, or the upper knee is too much bent. Unfortunately, all these wrong ways are especially natural.

Swum correctly, then, the side-stroke should swing along in four-four time. During the first beat, the upper arm comes down, the legs open, the breath comes in, and the under arm recovers. On the second, the legs close. The third is a rest. With the fourth, the under arm falls in and the upper recovers.

The side-stroke, under-arm or single over-arm, is on the whole the best all-round stroke; the one stroke, that is, which every swimmer ought to know whether he knows any other or not. In this respect it has pretty much superseded the old breast-stroke. It is easier to swim than the breast-stroke, and consequently faster. It lends itself better to swimming in skirts, since there is no lapful of water to be dragged along. Its chief disadvantage is that it does not allow the swimmer to see conveniently what is

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III

THE BACK-STROKE

o one stroke, however, is good for all occasions and for all purposes. ning-strokes are like clothes; one not get on comfortably with only it. If the side-stroke is the every- garment of the swimmer, the old ers and sweater in which he does his h work is the back-stroke. The back- ke is not ornamental, but it is the stroke that a tired swimmer can cling erything else fails. Swimming is of all methods the most and the one therefore which mmer up with the least ex- it is the easiest of all strokes the legs alone, it is the best

directly in front of him, or to view both sides at once. It works well in surf, since one has only to breathe in the trough of the wave, and let the crest run over him as it will; but in a short chop, where the waves are only a few inches high and correspondingly frequent, the stroke has its limitations. One thing with another, it has become the standard method of progression among swimmers who are good but not fancy.

III

THE BACK-STROKE

No one stroke, however, is good for all occasions and for all purposes. Swimming-strokes are like clothes; one does not get on comfortably with only one suit. If the side-stroke is the every-day garment of the swimmer, the old trousers and sweater in which he does his rough work is the back-stroke. The back-stroke is not ornamental, but it is the one stroke that a tired swimmer can cling to when everything else fails. Swimming on the back is of all methods the most like floating, and the one therefore which keeps the swimmer up with the least exertion. Since it is the easiest of all strokes to swim with the legs alone, it is the best

of all strokes whenever one must have his hands free, either to strip off his own clothing or to assist another person ashore. Moreover, in spite of its awkwardness, it is surprisingly fast, much faster than the breast-stroke; while for many persons it is the easiest of all strokes to learn. By all means, then, if ever we are likely to swim in open water outside a shallow tank, let us master the back-stroke.

The back-stroke lends itself especially well to learning without water. In fact, it is the only stroke which, without special apparatus, can be swum correctly and comfortably in the air. It is, besides, in all essentials the breast-stroke made easy. For these two reasons, it is a waste of time to attempt the breast-stroke before the back-stroke is well learned.

For the kick of the back-stroke: Lie

on floor or couch, face up, hands at side, legs straight and side by side, toes turned down. This is the "slide" position, in which the body will rest when moving by its own momentum. Through the following exercises, the heels are to be kept in contact with the surface on which the pupil lies. Draw up the feet, heels together, until they come to the spot where the knees were. The thighs should now make about a right angle with each other; that is to say, the knees will be something like a foot and a half apart. Straighten the legs, and at the same time carry the feet as far as possible away from each other, until at the finish, the legs and body together form a Y. This is the most difficult part of the stroke. It is also the most difficult part of the breast-stroke, which is, in this respect, exactly like it. Most persons who try to learn to swim and fail, fail at this point.

Small boys usually do it to perfection; women, unless they have been taught with unusual care, rarely do it at all. Without it, no speed is possible.

Unfortunately, the movement is difficult to describe. The motion is not a mere straightening of the legs, but a sort of flick of the lower leg from the knee. The feet travel in a curve, and each gets as promptly and as far as possible from its mate. Like the corresponding snap of the arm which puts the pace on a thrown ball, this peculiar motion comes with time and trying — or does not come at all. In the meantime, the foot, starting with the toes drawn up toward the shin, has returned to the position which it has in standing.

Now comes the second point at which many swimmers, especially women, go wrong in the breast-stroke. The legs must not simply float back to the slide position;

they must be snapped back hard. The drive of the leg-stroke comes from the reaction of the wedge of water held between the forks of the Y. In this part of the kick, the feet are held as during the preceding part, at right angles with the shin ; but the outer side is turned a little back of the inner, so that the sole of the foot catches the water like the blade of a screw-propeller. Pointing the toes downward tends to float the feet higher in the water.

The description of this leg-stroke often given, that it is like the leg-stroke of a swimming frog, is totally wrong. Frog and man recover a good deal alike. But the frog, after drawing up its legs, spreads its umbrella feet and kicks straight back. Its stroke is: up — back ; one — two. The man's stroke is: up — out — together ; one — two — three ; quite a different matter. The frog gets the push from the soles

of the feet; the man from the inside of the leg.

The principal difficulty with this leg-stroke, however, seems to be that the muscles which lie on the inside of the thigh close up to the body and draw the two legs together get very little use in common civilized life except by persons who ride horseback. In consequence, they are both weak and ill-controlled. For this reason, most people will save time in the end, by going through a few simple exercises for these muscles. Squeezing a chair-seat or other fair-sized object between the knees is good; or standing a-straddle on a smooth floor, either in stocking-feet or on a rug, and then drawing the feet together with a straight leg. One can easily invent such exercises; anything which draws the feet together will answer. Of all the separate movements of all swimming-strokes,

this breast-and-back-stroke kick is by far the most difficult.

The arm-action of the back-stroke, on the other hand, is the easiest of all. The arms, which have been lying at the sides during the slide, are bent a little at the elbows, and carried in the air nearly parallel with one another to a position well in advance of the head. They are then straightened, dropped into the water, and brought down just beneath the surface to their resting position at the sides. The motion is essentially like rowing with two oars. During the stroke, as in all cases, the wrists should be bent, first forward and then back, so that the palm of the hand is at right angles to the long axis of the body. The only point where it is possible to go wrong with this stroke is in not carrying the arms well clear of the water on the recovery.

The breathing follows the usual rule: the breath comes in when the arms are under water. The head will lift a little with the pull of the arms, and the breath should begin to be taken in when this lift begins to be felt; that is to say, when the arms are nearly down to the level of the shoulders. It goes out during the recover, when the arms are in the air. This breathing is, unfortunately, a little artificial, for the natural impulse is to reverse the order and inhale as the arms go up.

Unlike all other strokes, the back-stroke can be timed variously, taken with one slide or with two, and swum equally well, though not with equal speed, with the arms or without using the arms at all. Since, however, the back-stroke is essentially a resting stroke, the beginner at least should take it in slow time. The

most leisurely method of all, and one of the most delightful of all ways of swimming when the sun is warm and the clouds bright overhead, is: leg-stroke — slide; arm-stroke — slide. Both slides are made with the arms at the sides, and endure until the swimmer feels inclined to move again. At this pace, naturally, breath will be taken several times at each cycle. At full speed, the legs are drawn up as the arms are brought down, the arms rest at the sides during the kick, such slide as is allowed follows immediately after the kick. Then the arms are thrown above the head, and as they catch the water, the legs begin their recovery. Between these two timings, the swimmer can compromise almost anywhere. One of them at least should be mastered before entering the water.

There are various other forms of the

back-stroke, but this is by far the commonest and most useful. Its very considerable speed is due to the fact that the arms recover in the air, and so save both time and resistance; and that the knees, at the point where they drag most heavily in the breast-stroke, are in the back-stroke several inches above the surface.

The back-stroke being really learned on land, it remains only to transfer it to the water. Beginners who have practiced faithfully the preliminary exercises, who are not afraid, who already know how to float, and who float easily, should swim the back-stroke at the first trial.

For this, begin in the water very much as with the side-stroke. Lie on the beach with the legs in the water, and practice the kick. Gradually work offshore into deeper and deeper water, supporting the body on the shoulders and hands at first,

and later by the hands only, holding them opposite the hips so that the body balances. Don't bother with the arms. Learn the stroke with the legs only. After you can swim it freely, add the arm-stroke. In working off into deeper water, make haste slowly. Get off a foot or two at first and come aground again with one stroke. After this, move off farther and try two.

All beginners at this point make the same mistake — unfortunately, a most serious one. They should lie flat on the water, the hips at least as high as the shoulders; and the head thrown back as far as possible, so that the ears are submerged and the water comes almost to the eyes. A practiced swimmer, using legs only, can lift his head from the water and look round him, but the beginner must float every possible ounce of weight by

keeping his head down. Instead, however, of keeping the hips up and the head down, the novice usually wants to have the water round his neck, and to swim sitting down. Then the drive of the legs, which should lift the body in the water, merely doubles it up. The correct position for the learner is as if he were lying crosswise in bed, with his head hanging back over the edge. Timid persons are often helped in learning this stroke by using "water-wings" placed at the waist. But the less of these the better. An instructor can help also by lifting lightly on the belt, preferably by means of a cord attached to a light and springy rod.

IV

THE BREAST-STROKE

THE old breast-stroke has in these days so completely gone out of fashion that to many persons it seems no longer worth learning at all. In fact, many experts nowadays do not know how to swim it. Still, it does have certain advantages over all other strokes; and while it is true that for many swimmers it is not worth bothering with, it is for others distinctly worth while. If it is the slowest of all strokes, it is at the same time the best gymnastics: there is nothing like it to straighten up round shoulders or expand a flat chest. It is the only stroke which most persons can swim comfortably without wetting the hair,

and the one which gives the swimmer the best view of coming waves and floating objects; while as a change stroke, on a long swim, it is by no means to be despised. Finally, though it is the most difficult of all the common strokes to learn first, it is easily mastered if taken second or third.

The breast-stroke is simply the back-stroke turned over. The leg-kick is exactly the same. The arm-action is the same, except that the arms are bent more sharply on the recovery and pushed straight out in front from the chest; and are not brought round so far at the sides. These points, however, take care of themselves — the arms simply will not go any other way.

So far as the breath is concerned, the timing is the same as that of the back-stroke. The air is inhaled through the

mouth as the arms come back, and the hands, as they reach out on the last half of their recover, are "blown away from the face," — an excellent rule to keep in mind. The chief difference is that in the breast-stroke the arms, instead of resting at the side after their stroke, are immediately extended in front of the face; so that the slide occurs when the arms are at full reach.

All swimming-strokes are made difficult by the fact that, no matter how thoroughly the beginner has learned the movements, he still has to learn to balance the body in the water. But the breast-stroke has an additional difficulty of its own — the swimmer must manage to lift from the water a heavy head. On this account, the breast-stroke is sometimes best learned (as other strokes most emphatically are not) by the aid of

a floating support. For this nothing has ever proved superior to the old-fashioned wide plank, of light wood and as long, say, as the swimmer. In default of this, one can use water-wings placed close up under the arms or around the neck. The plank should be held by one end and at arm's length, in front of the face. As is the case with all strokes except the crawl, the kick should be mastered first. After that, one hand at a time can be taken from the plank, or the chin can be rested on the plank and both arms used. For one, however, who already swims side and back-strokes, all that is necessary for the breast-stroke is simply to turn over and swim. Even persons who swim the side-stroke only and have merely practiced the breast-stroke kick, can usually swim the stroke (not very smoothly, to be sure) at the first trial.

THE BREAST-STROKE

The breast-stroke is still so common, especially among swimmers of the older generation, and is so rarely swum exactly right, that it merits a somewhat careful description. The commonest error, and the most fatal, is that incorrect form of the kick which I have already discussed in connection with swimming on the back. Until this is cured, neither breast nor back-stroke can be swum decently; though for some reason or other, a bad kick is more easily reformed face up than face down.

It is a common fault, moreover, in the breast-stroke to make too much movement with the legs and too little with the arms. Drawing up the knees beyond the proper distance adds slightly to the power of the kick; it adds vastly to the drag of the recover. The proper place to stop is largely a matter of build, and must be determined by trial. It is a safe rule, how-

ever, that if at any point in the stroke, at any speed, the forward motion of the body ceases entirely, then the legs are being drawn up either too rapidly or too far. Some persons, be it observed, actually move backwards when the legs recover. On the other hand, the arms ought to be carried back as far as they will go. An arm-stroke cut off at the level of the shoulder comes to an untimely end.

All these various failings are apt to have a common origin in a wrong method of managing the breath. As the hands come back (when the stroke is done correctly), the little-finger side leads slightly the thumb, and the resulting inclined plane, pushing down on the water, lifts the front end of the body; the amount of the lift can be regulated by the degree of this inclination. The breath begins to come in as the hands get well separated; so that

by the time the arms are opposite the shoulders, the lungs are pretty well filled. The full lungs, therefore, float the head, no matter how far back the arms are carried nor how slowly the recovery is made. The breath expires as the hands go forward. But the hands as they shoot out, with fingers slightly higher than wrists, again form an inclined plane sliding up in the water, and they, in their turn, hold up the head until the lungs fill again.

Many, perhaps most, swimmers who have not been properly taught, reverse this timing, and breathe in when they should be breathing out. This brings them to the latter half of the arm-stroke with lungs empty when they should be full. The head in consequence sinks, while to prevent this the arm-stroke is cut too short and the arms are brought forward too soon. This in turn hurries the

leg-stroke, the slide is cut short, the entire stroke is taken too rapidly, and the swimmer in consequence soon becomes winded and demoralized. The remedy for this "vicious circle" of faults is the proper management of the breathing. That set right, most of the other troubles disappear of themselves.

Incorrect breathing results also in another fault equally fatal to ease and speed. Most unskillful swimmers carry the head too far back; and the feet, in consequence, are too low in the water. The effect of this position is that the body, instead of sliding easily through the water, shoulders first, ploughs through it with the whole front of the chest. On the other hand, if the breathing is right, the head can be carried easily with the mouth just above the surface as the lungs fill, and sinking beneath it again during the re-

mainder of the stroke. One must have the mouth above water to take in breath; one can breathe out anywhere.

The common remedy for incorrect breathing, short of reform, is to twist the head on one side, and lay the cheek down in the water. This has the disadvantage that it turns the body slightly on one side, interferes with the movements of the arms, and spoils the slide. If one is to turn on the side at all, he had much better turn clear over and swim the side-stroke. Unless the breast-stroke can be swum squarely on the breast, there is no reason for swimming it at all.

The slide, too, is another neglected portion of the breast-stroke. Nobody wants to swim all the time at full speed, while the breast-stroke is especially the method of leisure. It ought to be taken slowly, with deep, quiet breaths. But the stroke

itself should be vigorous, and after each kick should come the long, restful slide, when the body travels half its length and more, and the water lies close up to the swimmer's eyes. This is the special charm of the breast-stroke. Slowest of all strokes, and hardest to swim right; scorned of the racing man and the swimmer in tanks, in open water and in middle age it comes to its own.

V

THE TRUDGEON

THE king of all strokes, however, is the trudgeon. It is the fastest of all those which there is any fun in swimming. It is the one stroke which gives the highest speed with the least exertion: it is the one stroke which is suited equally for speed and distance, for racing and pleasure, for the swimming-tank and the open sea. Back-stroke, breast-stroke, and trudgeon make together a perfect equipment for any purpose.

The trudgeon, so-called because the great Trudgeon did not swim it and never heard of it in its present-day form, is essentially a double over-arm side-stroke, in which the body is turned face downward

in the water, in order that the under arm may be swung clear of its surface. As swum by sprinters, the body keeps face down most of the time. We shall take up here the more leisurely form in which the body rolls strongly.

No trudgeoning whatever is possible on land; it all has to be done in the water, and ought to be done after the side-stroke is familiar. Swim the side-stroke single over-arm. Upper arm, breath, slide, come in the usual way. At the end of the slide, as the under arm comes down, the body rolls slowly on its face. The pull of the under arm is at right angles with the water, as in one of the two methods in the side-stroke. Naturally, therefore, as the body rolls, the arm comes more and more to the front, until it finishes in the same relative position to the body as the upper arm. As in the side-stroke, the upper arm re-

covers as the lower arm comes down, but the recovery is not quite so easy in the trudgeon, because the upper shoulder is lower in the water. As the under arm finishes, the body now being face down on an even keel, this arm in its turn is swung forward clear of the water. Immediately the upper arm begins its pull, and at once turns the body on its side again. This, helped if necessary by a turn of the neck, brings the mouth again above the surface for the next breath. The breathing out comes after the proper interval, but through the nose under water. Like the other side-strokes, the double overarm is swum either side up; and best swum either indifferently.

The trudgeon, then, differs from the side-stroke in the roll of the body, and in the fact that both arms pull at right angles to the surface of the water. The difficult

part of the stroke is the timing. Breathing, roll, arms, legs, must begin and end their parts on the instant; and there are a good many things to be kept in mind at once. For this reason among others, not many persons swim the trudgeon smoothly and without splash. Swum nicely, it is as graceful as it is swift.

The ease and speed of the trudgeon arise from several elements. To begin with, much of the time the head is under water, so that no effort is wasted in floating it; and the body lies horizontally in the water and shoots through it with the greatest ease. In addition, both arms recover out of the water, as in the back-stroke, while the scissor-kick does away with much of the drag of the recovery.

For sprinting, the trudgeon is made still more speedy by the addition of a series of "crawl-kicks" (to be described

later) introduced between the end of the scissor-kick and its recovery, while the body is traveling on its face. Any reader with sufficient patience and imagination may now figure out how many different movements there are in the sprinting trudgeon, and just what each member is doing at each instant in the cycle of each of the others!

At the same time, the trudgeon is really not so bad as it sounds. After all, it is only the side-stroke plus the roll of the body. Nor is the peculiar method of taking breath with a turn of the head, and exhaling under water, especially troublesome. The difficulty is to get enough air at the right instant, and at the same time to keep all the other movements in mind. Most learners, therefore, will do well to practice the breathing as a separate lesson, first in wash-bowl or bath-tub,

and afterward floating face downward in the water, until the method becomes automatic. The secret of learning any complex act is in taking it one bit at a time.

VI

THE CRAWL

THE crawl is the newest and the fastest of all swimming-strokes. It is essentially a racing-stroke. The head is under water most of the time, so that with all its speed there is little fun in swimming it.

At the same time, it does have its place even for the non-racer. It is often convenient, for example, when diving is the order of the day, to be able to come back to raft or pier quickly — and for the distance that can be covered on one breath, the sprinting crawl is not far from twice as fast as the breast-stroke. In a river swimming-hole, too, there is usually not room enough to do much except sprint;

while for swimming under water, the crawl is especially good. Moreover, barring the breathing, the crawl is the easiest of all strokes to learn fairly well. To small boys who do not mind being ducked, it commends itself especially.

The crawl is literally a crawl along the water. The arms move as in the trudgeon, except that the elbows are bent and the stroke is correspondingly briefer, a sort of short-arm pull, passing into a paddling motion, and finishing as a push. The recovery is in the air. The leg-stroke is unlike anything else. The thighs are held motionless in line with the body, while the lower legs thresh up and down from the knees. It is pretty nearly, therefore, the movement of the child who lies on the floor on its stomach and waves its feet in the air. The knees should be close together; the feet should be extended

in line with the shins on the stroke; the best opinion seems to be that they should be drawn up on the recovery as in the scissor-kick. The feet should never be more than twelve or eighteen inches apart, and at their highest point may come well into the air. In short, in the crawl-kick, both legs have much the motion of the under leg in the scissor-kick.

Of timing in the crawl there is none. The arms alternate, and the legs alternate; but each goes its own gait without regard to the other. Many swimmers move the legs only just enough to keep them from sinking; a few let them trail behind and do not use them at all. Most, however, drive the legs rather hard. Each swimmer is a law to himself, according to the relative strength of legs and arms.

The hardest thing about the crawl is the breathing. The body travels flat on

the face, and the thrashing movement of the legs tends to throw the head under. Breath has to be taken, therefore, by a quick turn of the neck to one side. It may be taken as often as one pleases — at each stroke, at every other stroke, at each third stroke, according to the rapidity of the pace. Breath should be taken, however, as in the trudgeon, during the pull of the arm on the side toward which the head turns. The natural impulse is to take it just the other way, on the side of the arm which is in the air. It is a great mistake to take breath by lifting the head from the water as in the breast-stroke, since this position at once checks the swimmer's progress. Many persons, nevertheless, who cannot manage the proper breathing, keep the head above water all the time, and inhale as they please. For persons who are strong in the arms, and naturally

swim pretty high in the water, this is by no means a bad stroke for short distances.

The crawl can, however, be swum in a somewhat leisurely fashion by lengthening out the arm-stroke until it becomes like that of the trudgeon, and rolling the body strongly from side to side. This is the method ordinarily followed when the crawl is used for distance-racing; and the principle might be carried still further.

In fact, we are yet very far indeed from having exhausted the possibilities of the crawl. When it first came into notice, it was thought to be impossible for anything but short sprints. Now it is used for distances up to the mile. Still further modification might convert it into a rival of the breast-stroke for the timid and the middle-aged!

The crawl-kick is the most nearly frictionless of all leg-strokes. It ought, there-

fore, to be possible to make it the basis of some simple stroke for the beginner. To be sure, it is somewhat tiring; but on the other hand, it is the most natural of all leg-movements, and it does not have to be timed. I have myself experimented with a side-stroke in which the hips are slightly twisted and the crawl-thrash, made somewhat obliquely, replaces the scissor-kick. The stroke has the merit of great simplicity, is fairly rapid, and has proved especially suited to children who are too young to get the somewhat complex timing of the ordinary side-stroke. But of this more in its proper place.

I have been studying also another form of the crawl, which seems to offer possibilities of ease, if not of speed, for a swimmer whose build and temperament it chances to suit. This is a sort of double-sided trudgeon, with a crawl-kick. The

legs strike sharply, but with a pause after each straightening, so that one foot finishes before the other begins, as in the original or "Australian" crawl, in which arms and legs are timed like the legs of a trotting-horse. The arms work nearly as in the trudgeon. With the body on the side and the under arm at full reach, the upper arm is brought down and the breath inhaled. After a short pause in this position, the upper arm recovers, and at the same time the body rolls over to the other side, and the arm which was at first the under arm now becomes the upper and comes down as before. Thus the pulling arm is always the upper, and the face turns first to one side and then to the other. The stroke is a leisurely one, since neither arm is moving at the same time as the other; and it is, of course, entirely unsuited to racing. It can be swum also with

the scissor-kick, one kick to each arm-stroke instead of one for both. I mention these matters merely to point out that, while the new speed-strokes have thus far been pretty much the exclusive property of the racing men by whom they have been developed, there is no reason why the pleasure swimmer should not take them in hand and modify them for his requirements. The day has long gone by when it is supposed that any one stroke is best, or that any two persons must swim in the same way.

VII

OTHER STROKES

THE fact is, the number of possible strokes is pretty large, so that any ingenious person can invent them by the handful. There are three ways of using the legs, and four or five ways of using the arms. The body may travel on side, breast, or back; or roll from one to the other. The face may be carried in the water or out. Each of these several elements may be matched up with almost any other, and each may be variously altered at will.

Trudgeon, who seems to have started the spirit of innovation, swam a breast-stroke kick, both legs together, but combined this with the alternating double

over-arm movement which still bears his name. The original trudgeon soon yielded to the modern form with the scissor-kick; but for years this scissor-kick was made as wide as possible, in imitation of the kick of the breast-stroke. The side-stroke also was originally swum with the breast-stroke kick, and the arms, though no longer making the movements of the breast-stroke, still moved together instead of alternately. For a long time, in England, the single over-arm side-stroke with the scissor-kick, which was for years the favorite racing-stroke everywhere, had a curious flick at the end of the leg-motion, which seems hardly to have been used at all in this country. And there have been other variants adopted for a time by a few swimmers, and abandoned. There is a very fast back-stroke, in which the arms alternate, and the legs thrash

back and forth alternately — in short, a sort of crawl on the back. The back-stroke can also be swum with the scissor-kick.

In all this confusion, nevertheless, two tendencies have been clearly marked. The first has been to get both the arms out of the water on the recovery. The other is to sacrifice the power of the leg-stroke for the sake of getting rid of the drag of its recovery. For this reason the old breast-stroke kick gave way to the wide scissor-kick. This in turn has yielded place to narrow form. The crawl-kick is essentially a narrow scissor-kick, with the forward lift of the knee completely suppressed. At least one successful racer swims with the arms alone. The secret of modern speed-swimming is not the increase of power, but the cutting down of friction. It is by no means

impossible, therefore, that the next striking advance in the art will come from some method of carrying the feet forward above the water, and bringing them down beneath.

VIII

DIVING

DIVING ought properly to come before swimming. Most little boys learn to dive first, and to swim afterwards; and there is no reason why everybody should not follow this order. At any rate, every swimmer must learn to dive. It is the only proper way of entering the water; not only the prettiest, but the best fun. Somehow, too, the water never seems quite so cold when taken all at once, head-first. Anything, certainly, is better than the long-drawn agony of wading in.

Most useful of all dives is the "scoop" or shallow dive, which is practically the same thing as the racing start. For this, begin by forgetting all you have ever seen

of statuettes and photographs of posing divers, stand with toes gripping the edge of the take-off, the body bent forward and the hands hanging loosely or extended forward at about the level of the waist. Fall forward, with or without a swing of the arms; bend the knees; and as the body is just about horizontal, jump out strongly. The degree to which the body sinks on the knees, and the precise instant of the jump, will vary with the height of the take-off and the depth of the dive. The main point is that the body strikes the water stretched out at full length, arms in line with the body, feet turned back in line with the legs. The jump is out, or slightly down rather than up. The hands touch the water first, and not too far from the starting-point. The body enters the water at a low angle, and the diver is saved from a fearsome "gutsy" only by the fact that

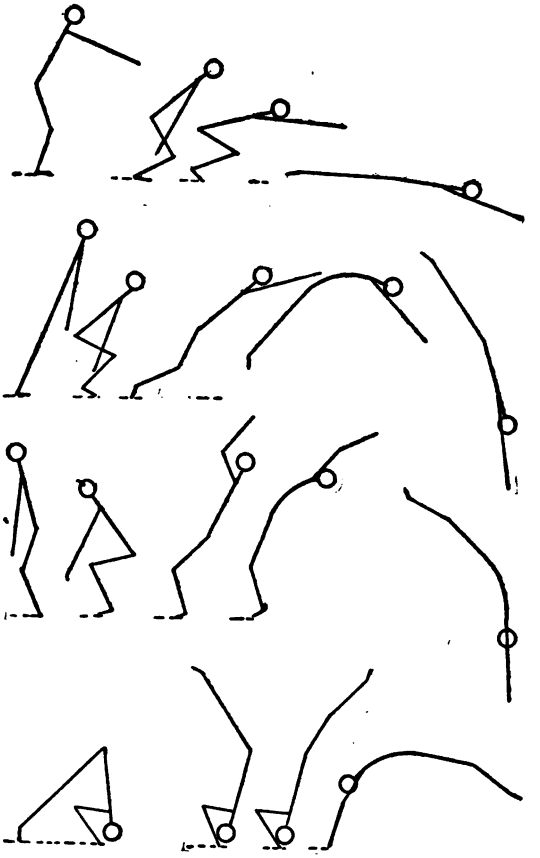

PLATE III

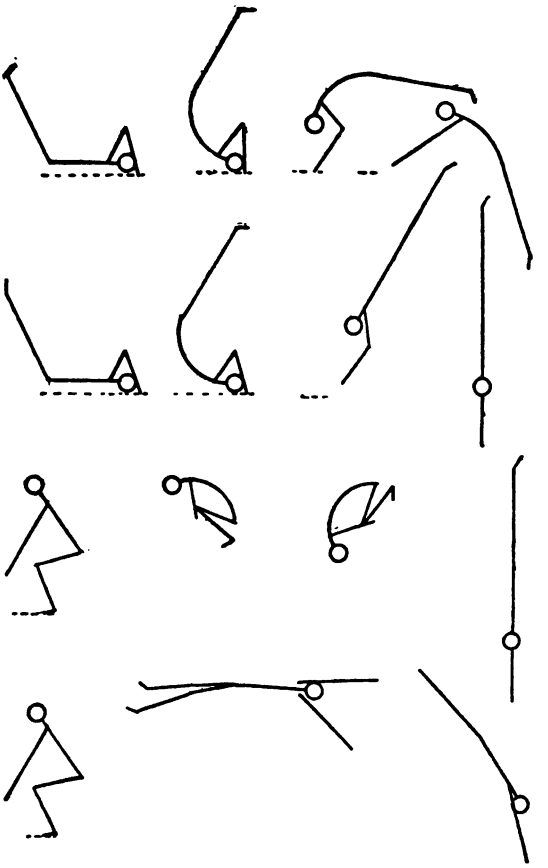

PLATE IV

his body is traveling rapidly in the direction of its length. This is the dive to use in shallow water, or wherever unknown dangers may be lying in wait. The body need go no more than six inches beneath the surface, while the head may be kept from going under at all.

The standing header, often confused with the shallow dive, is really decidedly different. One starts standing erect, with the hands at the sides. The topple forward is much the same, and also the sinking of the knees. But the arms must swing back as for the standing jump, and the spring must be slightly upward rather than out or down. The feet must be flung upward strongly, so that the body takes the water at a high angle and plunges deep into it. The hardest part is to get the feet well up.

Much of the difficulty of learning to

dive comes from confusing these two methods. In each there is a toppling forward and a strong spring: in both, the body is straight and hits the water end on. But in one form the diver shoots along the surface, in the other he springs into the air, turns over, and comes down into the water from above. The "gutsy" results from taking the header without sufficient turn.

The running header is like the standing, except for the run. The proper spring is not, as in the running jump, off one foot; but like the tumbler's spring, in which there is a short jump on to the take-off, from which the real jump follows, off both feet. In both running and standing headers, if the take-off is too low to allow a full turn in the air, arms, trunk, and legs will have to make a small angle with one another, and the diver enter the water on a curve. In no case, however, should the

knees be bent, or the legs straddled out into a V.

Another way of entering the water, which looks hard and is really easy, is the back dive. Stand with the toes on the take-off, the heels over the water. Lean forward at the waist, bend the knees, and carry the hands low at the sides. Fall backwards, and at the same time, fling the arms over the head and spring strongly. This is essentially a back flip, and the body enters the water much as in the front header, but curved, if at all, the other way. The back dive looks dangerous, but it is really one of the safest of dives, since a mistake in the turn costs only a slap on the back from the water — a quite different matter from the same blow in front.

There are besides, various dives off the hands — hand-springs and the like.

The easiest of all is to do a hand-stand with bent arms on the edge of the take-off, and to topple over toward the water, straightening the arms sharply as the body is nearly horizontal. In fact, many of the simpler tumbling feats are easily converted into dives.

IX

FLOATING

FLOATING, also, may well precede swimming. Many persons master it at the first trial; every one should learn the knack as early as may be, for it helps with the swimming, and gives the learner confidence. It is, moreover, a most valuable accomplishment. With it, the tired or winded swimmer can wait in comfort to recover himself. No one, in fact, who cannot float should ever venture into water beyond his depth.

Individuals differ greatly in the ease with which they float. Women usually excel men; plump, small-boned people do better than the lean and muscular. In general, one is floated either on his fat, or else by his lungs; so that different in-

dividuals will float somewhat differently, as they depend most on one or the other of these. The former class has little to learn. The latter must often acquire the art of keeping the lungs always nearly full, especially at the bottom; and breathing, so to say, off the top.

Floating is almost entirely a matter of balance. The feet, hands, and head will always sink; the chest will always float, and lift the other members. The arms, legs, and trunk are always close to the line, and may do either. The position of the head is fixed; the problem is to distribute the weight of the feet and hands so that the whole body will just balance on the chest as a fulcrum.

To learn the art, select shallow water; lie on the back, with feet inshore and on the bottom. The hands should extend at the side, and the finger-tips may at first

touch the bottom. In this position, master the side-to-side balance until the body can be kept from rolling. The head must be thrown well back, and submerged as far as possible. For most persons, this means that the water will cover both ears, and come up on the forehead almost to the eyes.

For the end-for-end balance, extend the arms horizontally at the sides, keep the hips high and the lungs full of air. At first let the heels rest on the bottom, but gradually, by slight rocking of the feet, try to work them clear of all support. Every movement must be made slowly and with much caution. A few fortunate persons can float in this position. Nearly all, however, will find that the feet sink, and that more weight must be shifted forward.

In this case, carry the hands cautiously

above the head; do not bend the elbows very much, and be sure that nothing projects from the water except the face, and perhaps the front of the chest. Usually, by the time the arms are stretched at full length over the head, where they are conveniently held by locking the thumbs, the feet will come up off the bottom. Oftentimes, it is sufficient to clasp the hands under the head. If holding the arms at full reach proves insufficient, it becomes necessary to reduce the leverage of the feet. For this the legs may be straddled apart, or bent to a right angle at the knee, or both. If these measures do not suffice, nothing remains but to fat up or to expand the lungs. Half the battle, however, is in getting the head well back, to take off as much as possible of the load of this especially dense member.

There are two adjuncts to floating,

both of which are most convenient, especially when the water is too rough for floating low in it, or when one has to float suddenly with no time to catch the proper balance.

The first of these is a sort of pedaling movement with the feet, almost exactly like the movement of riding a bicycle. This serves to keep the feet up and leaves the arms free for other matters, such as undressing.

A still more useful device is a sculling movement of the hands, held at the sides opposite hips or waist. They move in and out from the body, the upper arm motionless, and the action at wrist and elbows. As the hands go out, both going out together, the little-finger side is carried higher than the other; and as they come in, the slant is reversed. The hand is kept very flat, and really acts as an

inclined plane to lift the body. A motion of six or eight inches, back and forth, is quite sufficient. Moreover, if the fingers are higher than the wrist, the body will move along headforemost. If the wrist is higher than the fingers, the body moves feet first.

This sculling movement is the basis of many amusing feats in the water; for since the power is applied continuously, it is surprisingly efficient. A useful form of the back-stroke is swum with this movement in place of the usual pull of the arms. With it, the back-stroke may be swum with the head out of water. Taken alone, the sculling motion is a valuable means of resting; for the action is so different from all other movements used in swimming, that it is the completest possible change. Essentially, it is a device for floating high in the water.

X

TEACHING CHILDREN TO SWIM

TEACHING swimming to children under eight or ten years of age offers a problem of peculiar difficulty. They have so little voluntary attention and self-consciousness, that they can neither put their minds steadily on their work, nor direct accurately the movements of their own members. Worse than that, their disproportionately large heads make keeping afloat a far more difficult task for them than for an adult.

For both these reasons, the traditional introduction to the art, by way of the breast-stroke, is of all possible methods the worst. Far more than for an adult,

must the first attempts of a child be with a stroke which floats the head low in the water, and which has its timing and its movements nearly instinctive.

Logically, then, for a little child it should be a choice between back-stroke and side-stroke, where the artificial movements of the one offset the complicated timing of the other. Just which of these is better, and how one shall proceed with the instruction, must depend on the individual child. Age, intelligence, docility, fear of the water, sex, build, all modify the conditions of the problem. Much, too, depends on the instructor, and the time at his disposal; and also on the conditions under which the teaching is to be done, especially the temperature of the water. I can, therefore, only give my own experience for what it is worth.

One point, I think, is pretty clear. For

children under seven or eight, with ordinary conditions, the place to begin is not the open water but the family bath-tub. Little ones are easily frightened, and easily chilled. They always find it easier to play than to do any kind of lessons. A little tot, in a tub of warm water, with no other children about, will learn more in one week of systematic teaching than in a whole summer playing about on the beach. Fortunately, a fair-sized bath-tub is quite large enough for most of the fundamental movements of nearly all strokes. In fact, there are a few matters, such as the breathing of the trudgeon and the crawl, which even a grown man can practice there.

In spite of tales of children who swim before they can walk, I doubt whether any amount of pains will enable any ordinary child really to swim much under six years

of age. Much can be done at three and four toward laying the foundation; but few are the little boys, and still fewer the little girls, who can take care of themselves in the water before they are six or seven. At about this age, however, there seems to be a rather sudden expansion of muscular control, during which a boy turns from mere running and climbing to organized games, and for the first time in his life becomes able to put a bat in front of a ball. When this stage arrives, the boy can swim. One of my own children, as he passed his sixth birthday, could only flop along for ten yards or so. By the end of the next summer he was doing his hundred yards straight off, and could swim side-stroke, back-stroke, and crawl. There is, therefore, a psychological moment for swimming as for other acquirements.

Much can be done in a bath-tub and during the winter to prepare for this moment when it arrives. Even four is not too young to begin. The first point, of course, is to learn to manage the breath under water and to open the eyes. The eyes indeed pretty much take care of themselves, when once the child is persuaded to make the attempt. No one, I suppose, ever fails to do the trick at the first trial, provided the head is fairly submerged. Learners, unfortunately, are apt to put only the nose in the water and thus to wink the eyelids against the surface — a disconcerting experience which is likely to discourage further attempts. The eyes should be closed, carried well below the surface, and then opened. With this precaution, the knack is learned at once.

The breath, on the other hand, may not

be mastered even after many lessons; for children breathe so unconsciously that it comes hard for them to take thought. In the case of very little children, it may be necessary to begin with a course of lessons in holding the breath in the air. During the early trials in the water, the instructor may well hold the pupil's nose at first, have him later hold it for himself, and only after some time dispense with this aid. One need not say that the head must always be carried face downward, until the art is well learned. It is best also to begin from the first to do the breathing after the fashion of swimmers, in through the mouth, out through the nose, and to exhale with equal ease either above the surface or below.

My own boys at four have been able to keep the head under water for a quarter to a half minute. At five they picked up

small objects from the bottom of tub or basin with their mouths; and coasted face downward and headfirst down the sloping end of the bath-tub into the water, slid the length of the tub along the bottom, and finally emerged under the spigots.

When a child can do that, he is ready to be taken to the water and taught the plunge. For this one stands in water about waist-deep or less, and shoots forward, straight and stiff and face downward, until breath or momentum fails. Many boys who are self-taught pass from the plunge to swimming with the face in the water, either breast-stroke, "dog-paddle," or crawl. At any rate, from the plunge, the venturesome learner advances naturally to the dive, and from that to swimming under water. This much he may well acquire before learning to swim on the sur-

face at all. Most boys can learn to dive a full year before they are ready to swim.

There is another important preliminary to swimming, which can be taught nicely in the bath-tub, and that is floating. A little child in a long tub can be taught the entire art with the arms at full reach above the head. With larger pupils or smaller tubs, the floating must be done with arms at sides. In this case the heels should rest on a brick or other support.

Floating, however, though it comes very easy to most adults, is often difficult for little children. The trouble seems to be partly in their large heads and small chests; partly in the difficulty they have in keeping still; but more, I think, from timidity. The floating position, with the water always just on the point of running into the nose, is really pretty trying to any beginner. One should, therefore, proceed

with the greatest caution, beginning with small quantities of water, and increasing the depth only gradually. A fright at this stage is apt to be a serious matter, and to spoil the victim's nerve for years after. Small children should first learn to handle themselves face down before trying to float face up.

This much, however, is only preliminary to swimming; and with swimming comes the parting of the ways. Not every child can be taught the same stroke first.

Take the special case of a plump and light-boned girl of six, seven, or eight, especially if her swimming-place is cold, so that the bath must be short until she can swim hard enough to keep warm. If the water is also salt, so much the better. Let her learn to float in the bath-tub, hands at sides; she is of the build which floats easily and high in the water. Let her

also practice on floor or couch the exercises for the leg-movements of the back-stroke as given on page 27. A tub is not usually wide enough for the full kick, but much valuable practice on the most difficult part may be had by opening the legs to a V, with the knees straight, and then snapping them together for the finish of the back-stroke kick. In the case in which I have most thoroughly tested this method, I took my pupil, a girl of seven, into shallow water; held her lightly in the floating position, with arms at sides, and directed her to swim cautiously the back-stroke with the legs only. Immediately she pulled out of my hand, traveled more than her length, and bumped her head against the shore. She had swum the first time she tried. Girls usually, I find, take quickly to the back-stroke.

With little boys, on the other hand,

this method may not work at all. An active little chap is so much bone and muscle, and in consequence floats so low in the water, that the least movement pulls his head under. For the boy, then, as for many girls, some other stroke must come first.

There seem to be three possible ways, all about equally good in their place. The first is by way of the crawl, a method by no means bad for boys and men of any age. A somewhat obvious procedure is this: Teach the crawl-kick in the bath-tub. Teach also in the tub the method of breathing with a quick turn of the head over the shoulder. In the open water, try first the plunge; then the plunge with the kick; then with the arm-stroke; then with both. At each of the four stages try to have the learner snatch at least one breath over his shoulder. A forty-pound boy, if he can catch the knack of breathing, will swim

the crawl faster than any other stroke, and learn it as easily. The beauty of the crawl is that all the movements are so natural as to be quite instinctive, while the timing, often the most troublesome part of a stroke, takes care of itself.

The crawl breathing, however, is so difficult that many timid lads cannot get it. For such, and in general for little girls, there is a modified form of the side-stroke. The little swimmer should learn the scissor-kick thoroughly in the bath-tub. Fortunately, the scissor-kick is of all leg-strokes the one most easily learned in the tub. He should then try to swim, lying on the side and using the scissor-kick; but instead of the proper arm-stroke to go with it, he may make a sort of rapid, alternate, pawing motion, with bent elbows. This movement will come almost of itself, and there need be no

attempt to time arms and legs with one another. The head in this stroke will have to be twisted well over so that the face is up.

After this is learned fairly well, so that the swimmer is good for ten yards or so, the arm-stroke should be lengthened out and its rate correspondingly slowed down. This takes place somewhat gradually. When it is completed, the child is swimming the side-stroke; probably, however, with the wrong timing, since the natural impulse is to make the legs go with the upper arm. Later, when the child is older, this fault will have to be corrected.

Between these two methods, the choice must depend largely on the child's temperament, chiefly upon how much it dislikes to put its head under water. Either answers for children almost, but not quite, old enough to learn as an adult learns.

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For very small children, however, neither method answers at all well. The first is too difficult; the second breaks down because a really little child, no matter how carefully he is taught the scissor-kick, as soon as he finds himself in the water, reverts to the creeping motions of babyhood, and flops his arms and legs alternately.

He can, nevertheless, be taught to swim on the basis of his instincts, by means of a nondescript sort of stroke; a mixture of side-stroke, crawl, and the old "dog-paddle" stroke, which most self-taught boys learn first by nature. This may be described as crawl behind, dog-paddle in front, with the body on the side, and the head twisted into the floating position. It is, in short, a combination of the first and second methods, outlined above. It should be swum

during one season only, and in the next changed in one direction into the side-stroke, or in the other into the crawl.

Naturally, none of these three strokes is ever likely to become popular for distance racing. They can, nevertheless, be learned a year or two earlier than any proper stroke. And how many little children, every year, are drowned almost within arm's length of safety!

INDEX

Arm movements, 63; side-strokes, 12–13, 15–16, 50; back-strokes, 31, 62, 75–76; breast-stroke, 38; crawl, 54, 57.

Back-dive, 69.
Back-stroke, 3, 25–36, 47; uses, 25–26; preliminary exercises, 26–31; leg movements, 26–30; arm movements, 31; breathing, 32; timing, 32–33; variants, 33–34, 62–63, 76; practice, 34–35; errors, 35–36; for children, 78, 85–86.
Bath-tub, practice in, 51, 79, 81–83, 84–85, 87, 88.
Breast-stroke, 3, 4, 26, 47; uses, 37–38; relation to back-stroke, 38; breathing, 38–39, 42–45; with support, 40; errors, 41–46; for children, 77, 83.
Breathing, principles, 14–15, 21; side-stroke, 21–22; back-stroke, 32; breast-stroke, 38–39, 42–45; trudgeon, 48, 49, 51–52; crawl, 55–56; practice, 81–83.

Children, 5, 77–91; strokes adapted to, 78, 85–91; in bath-tub, 81–83, 85–86; 87–88; age to begin, 79–80; floating, 84–85.
Crawl, 5, 40, 53–60; uses, 53–54; arm movements, 54; leg movements, 54–55; timing, 55; breathing, 55–56; variants, 57–60; for children, 83, 87–91.

Diving, 65–70; scoop dive, 65–67; header, 67–69; back dive, 69; other dives, 69–70.

INDEX

Drowning from incorrect breathing, 15.
Dog-paddle, 83, 90.

Eyes, opening in water, 81.

Floating, 71–76; theory, 71–72; practice, 72–74, 84; movements to aid, 74–76.

Header, 67–69.

Leg movements, 5; side-strokes, 8–11, 15, 50, 58–60, 62, 88–90; back-strokes, 26–30, 62–63; breast-stroke, 38; crawl, 50, 54–55, 57–58, 90; tendencies in, 63–64.

Plunge, 83, 87.

Scissor-kick, 5, 8–11, 60; theory, 10; original form, 11, 62; with back-stroke, 63; for children, 88–90. See leg movements, side-stroke.
Scoop dive, 65–67.
Sculling with hands, 75–76.
Side, swimming on either, 17, 49.
Side-stroke, under arm, 3, 4; preliminary exercises, 7–9, 14, 18; leg movements, 8–11, 15; arm movements, 12–13, 15–16; timing, 14, 15–16, 23, 89; breathing, 14–15, 21–22; practice, 18–20; errors, 9, 21–22; uses, 23–24; original form, 11, 62; for children, 78, 88–90.
Side-stroke, single over-arm, 4, 20–21; uses of, 23–24.
Side-stroke, double over-arm. See trudgeon.
Slide, 8, 16, 27, 33, 45–46.
Supports in learning, 20, 39–40.
Swimming, advantages, 1–2, first stroke, 3–6, 77–78, 85–91; order of strokes, 5; side-stroke, 7–24; back-stroke, 25–36; breast-stroke, 37–46; trudg-

eon, 47–52; crawl, 53–60; dog-paddle, 83, 90; other strokes, 61–64; tendencies in, 63–64; of children, 5, 77–91.

Trudgeon, 4, 47–52; described, 48–49; for sprinting, 50; breathing, 48, 49, 51–52; variants, 50, 58–60; original form, 61–62.

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